

STATE OF GEORGIA
TMDL IMPLEMENTATION PLAN

Polychlorinated Biphenyls (PCBs)
Fish Consumption Guidelines Due To PCBs
Commercial Fishing Ban in Purvis Creek Due To PCB

Prepared by
The Georgia Department of Natural Resources
Environmental Protection Division
Atlanta, GA

TMDL Implementation Plans are platforms for establishing a course of actions to restore the quality of impaired water bodies in a watershed. They are intended as a continuing process that may be revised as new conditions and information warrant. Procedures will be developed to track and evaluate the implementation of the management practices and activities identified in the plans. Once restored, appropriate management practices and activities will be continued to maintain the water bodies.

IMPACTED SEGMENTS

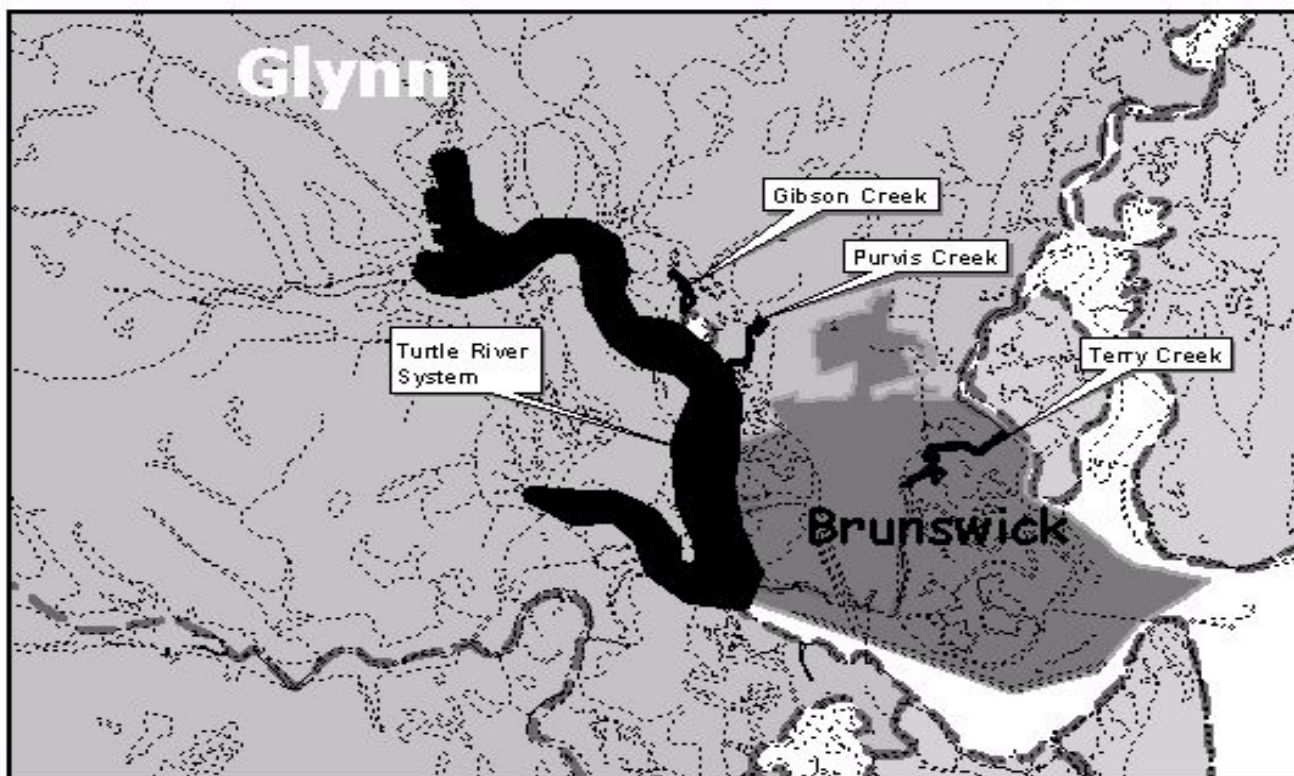


FIGURE 1

Impaired Waterbody	Impaired Stream Location	River Basin
Gibson Creek	Brunswick	Satilla
Purvis Creek	Brunswick	Satilla
Turtle River System	Brunswick: Turtle River, Buffalo River, and South Brunswick River	Satilla
Terry Creek	Brunswick	Satilla

INTRODUCTION

On the 2000 §303(d) list, the State of Georgia has identified the following tidal estuarine waterbodies as not supporting their designated use due to polychlorinated biphenyl (PCB) contamination in fish tissue:

Waterbody Name	Location	Miles/Area Impacted	Pollutant
Gibson Creek	Brunswick	1	FCG (PCB), PCB
Purvis Creek	Brunswick	1	FCG (PCB), PCB, CFB
Turtle River System	Brunswick: Turtle River, Buffalo River, and South Brunswick River	18	FCG (PCB)
Terry Creek	Brunswick	1	FCG (PCB)

The Georgia Department of Natural Resources has issued fish consumption guidelines (FCG) for these waters due to PCB contamination in fish in all listed segments. In addition, a commercial fishing ban (CFB) was issued in Purvis Creek due to PCB levels in fish tissue that exceed Federal Drug Administration action levels. PCBs are priority toxic pollutants and their use and discharge is not permitted in any of the listed segments.

PCB contamination in the listed estuarine segments has been attributed to contamination from the Linden Chemicals and Plastics (LCP) Superfund Site. The LCP Superfund Site consists of 550 acres (majority tidal marsh). Over the last 70 years, an oil refinery, a paint manufacturing company, a power plant, and a chlor-alkali plant have all operated at this site. PCBs, mercury, and semi-volatile contamination are widespread across the plant site soils, in groundwater, and in the biota in the marsh.

In March 1995, the State of Georgia designated the LCP facility as the highest priority release site in Georgia and requested that the Environmental Protection Division (EPA) immediately place it on the Superfund National Priorities List. The US EPA Region 4 Emergency Response and Removal Branch has been studying the site since 1994.

DISCUSSION OF POLLUTANT

The following general background on the impact of PCBs on fish consumption is taken from EPA "Fact Sheet: PCBs Update: Impact on Fish Advisories" (EPA-823-F-99-019):

PCBs are a group of synthetic organic chemicals that contain 209 possible individual chlorinated biphenyl compounds. These chemically related compounds are called congeners and vary in their physical and chemical properties and toxicity. There are no known natural sources of PCBs. Although banned in the United States from further production in 1979, PCBs are distributed widely in the environment because of their persistence and widespread use. PCB mixtures found in the environment are different from the commercially produced PCB mixtures (known as Aroclors in the United States) because of differences in chemical properties, persistence, and bioaccumulation among the different congeners. The most common analytical method used to detect PCBs in the environment is based on Aroclor analysis; however, congener-specific methods have been developed and currently are being tested.

PCB exposure is associated with a wide array of adverse health effects in experimental animals. Experimental animal studies have shown toxic effects to the liver, gastrointestinal system, blood, skin, endocrine system, immune system, nervous system, and reproductive system. In addition, developmental effects and liver cancer have been reported. Skin rashes and a severe form of acne have been documented in humans; however, other effects of PCB exposure in humans are not well understood. EPA has classified PCBs as probable human carcinogens (Group B2). As of 1998, 37 States have issued 679 fish advisories for PCBs. These advisories inform the public that high concentrations of PCBs have been found in local fish at levels of public health concern. State advisories recommend either limiting or avoiding consumption of certain fish from specific waterbodies or, in some cases, from specific waterbody types (e.g., all freshwater lakes or rivers).

PCB is a legacy pollutant. Legacy pollutants are substances whose use has been banned or severely restricted by the EPA, but still remain in the environment. These substances often remain at elevated levels for many years after their widespread use has ended due to their slow rate of decay. Legacy pollutant concentrations gradually decline as a result of natural attenuation processes via continuing degradation and metabolism of the contaminants, burial of contaminated sediment through natural sedimentation in the urban lakes, and scouring and redistribution of sediments in the river.

POLLUTANT SOURCES

Nonpoint source pollution can generally be defined as the pollution caused by rainfall or snowmelt moving over and through the ground. As water moves over and through the soil, it picks up and carries away natural pollutants and pollutants resulting from human activities, finally depositing them in lakes, rivers, wetlands, coastal waters, or ground water. Point sources of pollution are defined as discharges of treated wastewater directly into streams from wastewater treatment plants.

PCB contamination in the listed estuarine segments has been attributed to contamination from the LCP Superfund Site. From 1955 until 1994 the facility used a chlor-alkali process to produce chlorine, caustic soda, hydrochloric acid, and hydrogen gas. In 1994, the Georgia Environmental Protection Division revoked the facility's discharge permit.

There are no permitted point source dischargers with existing allocations for PCBs. Thus, the wasteload allocation for PCBs is zero pounds per day. The LCP Superfund Site represents a nonpoint source legacy load of PCBs (no discrete conveyance) and thus loading from the LCP Superfund Site should be at concentrations equivalent to or less than the water quality standard for PCBs (0.00045 µg/l). Thus, the load allocation allows for no loads that cause or contribute to an in-stream mixed water column PCBs concentration above 0.00045 µg/l.

PLAN FOR IMPLEMENTATION OF TMDL

Gibson Creek, Terry Creek, Purvis Creek, and the Turtle River System have been placed on the State of Georgia 303(d) list due PCB contamination of fish and shellfish in these waterbodies. A TMDL has been developed for these listed reaches. The TMDL establishes the total mass of PCBs that can be discharged to the system under a prescribed set of critical conditions to meet their designated uses.

The Superfund Remedial Program is assessing the need for further action at the LCP Superfund Site. The Superfund cleanup process proceeds through several phases. Usually, after a site is listed or proposed for listing on the NPL, a remedial investigation/feasibility study (RI/FS) is performed at the site. The Risk Assessment, Remedial Investigation, and Feasibility Study documents for the marsh/upland soil operable unit and groundwater operable unit are under review. See the attached papers entitled "Georgia NPL/NPL Caliber Cleanup Site Summaries" and "U. S. Environmental Protection Agency Remedial Investigation Fact Sheet" for more information. The RI/FS results in a Record of Decision (ROD), which is a public document that explains which cleanup alternatives will be used to clean up a Superfund site. At a minimum, groundwater and biota monitoring will be necessary for many years.

A removal action by EPA, completed Spring 1999, has excavated over 132,000 tons of Subtitle C RCRA Hazardous Waste and over 121,000 tons of Subtitle D soils and sediment from the LCP Superfund Site. Approximately 13 acres of marsh and marsh channels adjacent to the site have been removed.

The Superfund Remedial Program is continuing to assess cleanup feasibility in and around the LCP Superfund Site. The ongoing effort will provide information that can help to quantify the PCB load being released and attempt to resolve the legacy load of PCBs in the sediment and/or water column. The program will identify the selected cleanup alternative and establish the level of cleanup expected to be achieved through implementation of the selected remedy. This information will be critical to potential future revisions of this TMDL. Ongoing Superfund activities related to the Site provide reasonable assurance that the necessary reductions in PCBs can be achieved in this system.

EPA anticipates that future Superfund Remedial Program activities will result in affected waterbodies attaining water quality standards for PCBs through reductions in both point source and nonpoint source loadings to the waterbodies. EPA expects necessary load reductions can be achieved through implementation of the selected remedy. Follow-up monitoring conducted in relation to ongoing Superfund activities and any other necessary monitoring will determine the necessity for revisions to the TMDL.

MONITORING PLAN

The extent of contamination from the LCP Superfund Site continues to be evaluated through the remedial cleanup process. Further monitoring of the groundwater will be necessary. The State should monitor the listed segments' water column concentrations for Arochlor 1268 using the lowest detection limit available. In addition, fish tissue and sediments should continue to be monitored while the Superfund program completes recommendations and the remediation strategy. Follow-up PCB monitoring should be conducted to include all species where resources are available.

EDUCATION/OUTREACH ACTIVITIES

The Environmental Protection Division will continue to provide guidance and education to the public on all water quality issues through outreach by the Water Protection Branch. The Pollution Prevention Assistance Division is another excellent resource for this outreach. When necessary, the Department of Natural Resources will issue fish consumption guidelines. These guidelines are updated annually in the DNR publication *Guidelines for Eating Fish from Georgia Waters* in the DNR publication *Guidelines for Eating Fish from Georgia Waters*, identify specific stream segments where there is a problem, and list all known species of fish with PCB contamination and how often they may be consumed.

The US EPA Region 4 Emergency Response and Removal Branch will be conducting Public Availability Sessions and Proposed Plan Public Meetings in the future.

STAKEHOLDERS

The Superfund Remedial Program is assessing the need for further action and will seek public involvement and the active participation of stakeholders in the process. The following stakeholders have been identified and are working with the program:

Since 1919 the LCP Superfund site has been occupied by at least five major companies: Atlantic Refining Company (ARCO); Georgia Power Company; Dixie Paints and Varnish Company (currently, the O'Brien Company); Allied Chemical Inc. (currently, Allied Signal); and, the Hanlin Group subsidiary, LCP Chemicals-Georgia, Inc.

The US EPA Region 4 Emergency Response and Removal Branch

Environmental Protection Division Superfund Remedial Program



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Georgia NPL/NPL Caliber Cleanup Site Summaries

Superfund (CERCLA)
Cleanups

Corrective Action
(RCRA) Cleanups

Managing Wastes

Emergencies

Federal Facilities

Risk Assessment

Brownfields

LCP Chemicals Georgia Inc.

EPA ID: GAD099303182

Brunswick, Glynn County, GA

Congressional District: 01

NPL Status: Proposed: 10/02/95; Final 06/17/96

[Project Manager](#)

Administrative Record Index ([Adobe Reader Required](#)): [Removal](#)

Site Repository:

Brunswick/Glynn Co. Regional Library

208 Gloucester St.

Brunswick GA 31523

Documents:

[Fact Sheet, June 2002 \(PDF, 22K\)](#)

Site Background:

The LCP Chemicals Superfund Site consists of 550 acres, the majority of which is a tidal marsh. An oil refinery, a paint manufacturing company, a power plant, and a chlor-alkali plant have all operated at this site over the last 70 years. Mercury, polychlorinated biphenyls (PCBs), and semi-volatile contamination are prevalent across the plant site soils, in groundwater, and in the biota in the marsh. Since 1919 this site has been occupied by at least five major companies: Atlantic Refining Company (ARCO); Georgia Power Company; Dixie Paints and Varnish Company (currently, the O'Brien Company); Allied Chemical Inc. (currently, Allied Signal); and, the Hanlin Group subsidiary, LCP Chemicals-Georgia, Inc..

The contamination of greatest concern at this Site is a large dispersion of mercury and polychlorinated biphenyls throughout the marshlands that was the result of the chemical manufacturing process undertaken by Allied Signal and LCP between 1955 and 1979; EPA estimates that more than 380,000 pounds of mercury were "lost" in the area during this period. In addition to mercury and polychlorinated biphenyls, lead, other metals, and volatile organic compounds have contaminated the 500-acre marshlands area, a 1-mile portion of the Turtle River and the entirety of Purvis Creek. Mercury and polychlorinated biphenyls have been detected in aquatic life at levels sufficient to produce a ban on commercial fishing in these areas and a seafood consumption advisory for part of the river and all of the creek.

Cleanup Progress: Threat Mitigated by Physical Clean-up Work

Upon the plant's closing in February 1994, the State of Georgia asked EPA to take immediate action at the Site; EPA needed to address the threat of releases of chlorine gas and the flow of contamination into the adjacent saltwater tidal marsh containing endangered species.

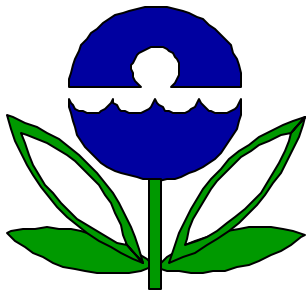
In 1994, EPA issued a Unilateral Administrative Order for Removal (UAO) to several of the former owner/operators of facility instructing them to undertake cleanup operations at the Site. In March 1995, the State of Georgia designated the LCP Site as the highest priority release Site in Georgia and requested that it be immediately placed by EPA on the Superfund National Priorities List; on June 17, 1996, the Site was finalized on the NPL. EPA has to-date recovered over 400,000 pounds of mercury, and overseen the treatment of over 55 million gallons of wastewater.

A removal action by EPA has excavated the vast majority of the on-site soils and waste piles. The Removal was completed Spring, 1999. Over 132,000 tons of Subtitle C RCRA Hazardous Waste and over 121,000 tons of Subtitle D soils and sediment have been removed from the LCP Chemicals site. Approximately 13 acres of marsh and marsh channels adjacent to the LCP site have been excavated.

The Superfund Remedial Program is assessing the need for further action at the Site. at a minimum, groundwater and biota monitoring will be necessary for many years. The Risk Assessment, Remedial Investigation, and Feasibility Study documents for the marsh/upland soil operable unit are under review. For the second operable unit concerning groundwater and the former cell building area, comments on the remaining RI/FS documents are under review. Further monitoring of the Site groundwater will be necessary since a very high pH (>13) exists, which seems to be dissolving sand in a localized area of the Site; however this high pH and highly contaminated groundwater plume seem to dissipate as it flows toward the marsh where the pH is buffered back to normal levels.

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Last updated on Wednesday, November 13th, 2002
URL: <http://www.epa.gov/region4/waste/npl/nplga/lcpincga.htm>



**U. S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL INVESTIGATION FACT SHEET**

LCP CHEMICALS, BRUNSWICK, GEORGIA

Region 4

June 2002

This is a short update on the status of the EPA work ongoing at the LCP Chemicals, Superfund site. This summary covers the status of the ongoing Remedial Investigation and Feasibility Study for the Upland soil and Groundwater operable units.

SITE HISTORY

Oil Refinery and Power Plant - The Atlantic Richfield Company (ARCO), a successor to the Atlantic Refining Company, operated the site as a petroleum refinery from 1919 to the early 1930's. The refinery was fueled by coal until 1922, after which oil was used as fuel. Refinery operations ceased by 1935. Georgia Power purchased portions of the site in 1937, 1942, and 1950. These purchases included two parcels of land and two 750 kilowatt electric generators from ARCO. Georgia Power subsequently added an additional 4.0 megawatts of electric generation capacity at the site. Bunker C oil was used as the fuel source in the on-site power plant.

Chemical (chlor-alkali) Plant - The Dixie Paint and Varnish Company operated a paint and varnish manufacturing facility at the site from 1941 to 1955 on a portion of the site property south of the Georgia Power parcel. Allied Signal operated a chlor-alkali facility at the site from 1955 to 1979, principally for the production of chlorine gas,

hydrogen gas, and caustic solution using the mercury cell process. This involved passing a concentrated brine solution between a stationary graphite or metal anode and a flowing mercury cathode to produce chlorine gas, sodium hydroxide (caustic) solution, and hydrogen gas, as a by-product. Sodium hypochlorite (bleach) was also produced in a secondary reaction.

LCP Chemicals - LCP purchased the property and plant in 1979. The chlor-alkali process continued with modification following the purchase. Part of the modification included the production of hydrochloric acid by reacting chlorine and hydrogen. Manufacturing operations continued until February 1994, when LCP notified site personnel that it would cease operation due to the revocation of the facility's water and air permits by the Georgia Environmental Protection Division (GA EPD).

Superfund Response Activity - In April 1994, EPA ordered the responsible parties to conduct a removal action at the Site. The removal cleanup for the upland soils was completed in July 1997. The removal action for the marsh area was completed in July 1999. During the removal action, more than 130,000 cubic yards of contaminated soil and sludge were removed from the upland soil area and 13 acres of contaminated sediment were excavated from the marsh. Contaminated soil, sludge and sediment were disposed in permitted landfills.

NPL Listing - The LCP site was proposed for listing on the National Priorities List (NPL) in October 1995. The site was finalized on the NPL in June 1996. The PRPs signed an Administrative Order on Consent in June 1995 to conduct the Remedial Investigation/Feasibility Study (RI/FS) for the Site. The RI/FS for upland soil and marsh areas was completed in March 2002. This study included evaluations of possible risk and measures to reduce risk.

OPERABLE UNIT 1 (OU) - UPLAND SOIL AND MARSH

The RI/FS is almost expected to be completed in September. The human health and ecological risk assessments are currently being reviewed. Although the RI/FS report has been completed, the PRP have submitted a draft FS addendum, at EPA's request, to present additional cleanup alternatives for the marsh. A copy of the draft FS addendum has been sent to the Glynn Environmental Coalition, the community group awarded the technical assistance grant (TAG) for this site.

EPA is in the process of coordinating the development of a proposed plan with GAEPD and other National Resource Trustees.

OPERABLE UNIT 2 - GROUNDWATER

The RI/FS is expected to be completed in September. The human health risk assessment has been submitted and is being considered for approval. At the request of EPA and GAEPD, the PRPs performed a supplemental RI field investigation in Fall 2001; results are provided in an RI Addendum report dated January 2002. EPA and GAEPD are coordinating the finalization of the RI report.

The PRPs will be collecting additional data from horizontal wells which were recently installed beneath an upper confining layer on site. Data from this sampling event will be included in a second RI Addendum scheduled to be submitted to EPA for review in June 2002. The FS report will follow in August.

WHAT TO EXPECT IN THE FUTURE

**Final RI/FS for Upland Soil
Final RI/FS for Groundwater
Public Availability Sessions
Proposed Plan Public Meetings**

**If you would like to speak to EPA about issues
related to the Site you may contact:**

**Ken Lucas, Remedial Project Manager
U. S. EPA - REGION 4
61 Forsyth Street, SW
Atlanta, Georgia 30303**

Call toll free 1-800-435-9234

Definitions

Remedial Investigation/Feasibility Study:

After a site is listed on the NPL, a remedial investigation/feasibility study (RI/FS) is performed at the site. The RI serves as the mechanism for collecting data, while the FS is the mechanism for the development, screening, and detailed evaluation of alternative remedial actions. The RI and FS are conducted concurrently. Data collected in the RI influence the development of remedial alternatives in the FS, which in turn affect the data needs and scope of treatability studies and additional field investigations.

Information Repository:

File set up near Superfund sites for the public which contain information and reference documents relevant to EPA activities.

National Priorities List (NPL):

EPA's list of priority hazardous waste sites that are eligible to receive federal money for response under Superfund.

Superfund:

The common name used for the Comprehensive Environmental Response, Compensation, and Liability Act, also referred to as the Trust Fund. The Superfund program was established to oversee the cleanup of hazardous waste sites.

Operable Unit:

An operable unit is a contaminated part of a site which may be addressed separate and apart from other portions of the site. An

operable unit can also be described as “a cleanup phase.”

Administrative Order on Consent:

A legal and enforceable agreement signed between EPA and Potentially Responsible Parties where by PRPs agree to perform or pay the cost of site investigation

Potentially Responsible Parties:

The Superfund law (CERCLA) allows EPA to respond to releases or threatened releases of hazardous substances into the environment. Under CERCLA, potentially responsible parties (PRPs) are expected to conduct or pay for the cleanup. The Superfund enforcement program identifies the PRPs at the site; negotiates with PRPs to do the cleanup; and recovers from PRPs the costs spent by EPA at Superfund cleanups.

Technical Assistance Grant :

A Technical Assistance Grant (TAG) provides money for activities that help communities participate in decision-making at eligible Superfund Sites. An initial grant up to \$50,000 is available for any Superfund site that is on the National Priorities List (NPL) or proposed for listing on the NPL and a response action has begun.

Record of Decision:

The Record of Decision (ROD) is a public document that explains which cleanup alternatives will be used to clean up a Superfund site. The ROD for sites listed on the NPL is created from information generated during the RI/FS.



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Superfund Site
June 2002 Update